

# RESEARCH PATENT SPECIFICATION

682,137



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## COMPLETE SPECIFICATION

### Improvements relating to Suction Cleaners

We, HOOVER LIMITED, a Company registered under the Laws of Great Britain, of Perivale, Greenford, Middlesex, do hereby declare the invention (communicated by THE HOOVER COMPANY, a Corporation created and existing under the Laws of the State of Ohio, United States of America, of North Canton, Ohio, United States of America), for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

15 This invention relates to suction cleaners and is concerned with an improved construction tending to ensure regular cleaning of the filter.

According to the present invention a 20 suction cleaner includes a filter through which air is drawn by an electric-motor-driven fan, a reel for winding a flexible cable through which the motor is supplied, and means actuated by rotation of the reel 25 for cleaning the filter as the cable is wound in and/or out.

Conveniently the stator of the motor is mounted to rotate about its axis with the cable reel. It is thus possible to dispense 30 with any slip rings or the equivalent between the motor and the cable on the reel.

The invention is particularly, though not exclusively, applicable to cleaners of 35 the vertical axis canister type in which case the cable reel may be mounted near the top of the cleaner to rotate about a vertical axis. The reel may be provided with a handle accessible at the top of the 40 cleaner to turn the reel for winding in the cable. Conveniently the dust is collected on the outside of a generally tubular filter, whence it can fall into a dirt receiving container.

45 The invention may be carried into practice in various ways but two specific embodiments will be described by way of example with reference to the accompanying drawings, in which:—

Figure 1 is an elevation, mainly in section, of a suction cleaner embodying the invention.

Figure 2 is a plan view of the cleaner with parts broken away,

Figure 3 is a sectional under plan on the irregular line 3—3 of Figure 1,

Figure 4 is a sectional elevation of a modified arrangement, and

Figure 5 is a sectional under plan on the line 5—5 of Figure 4.

The suction cleaner shown in Figures 1, 2, and 3, includes a casing 6, to the bottom of which a dirt-receiving pan or container is detachably connected as by means of releasable clamps 8, the pan 65 having a socket 9 to receive a flexible hose, not shown.

At its upper end the casing has secured to it a cast spider 10, which terminates in a vertical tubular portion 11, to form 70 a bearing for the upper tubular end portion 13 of a motor casing 12, so that the motor can rotate about its vertical axis.

The upper end of the tubular portion 13 of the motor casing carries a dome-like 75 cover 14, the lower edge of the skirt of which forms a reel 15 for the flexible cable 17 through which the motor is supplied with current through a switch 16 also mounted on the cover 14. An outer 80 cover 18 secured to the top of the casing 6 surrounds the reel and has in it openings 19, for the escape of air drawn through the filter. The cable extends from the reel out through an eye or fairlead 20 in 85 the outer cover 18 and carries a suitable plug 21 at its end. The cover 14 also carries a handle 22 by means of which it can be turned for winding the cable on to the reel. At its centre the cover 14 90 has a removable cap 23 which can be removed for inserting the hose into the upper tubular end portion 13 of the motor casing for cleaning by blowing. When the hose is connected to the socket 9 for 95 cleaning by suction the cap 23 remains in place and the air is exhausted through the lateral openings 19 in the cover 18.

The shaft 24 of the rotor 25 of the motor carries a two-stage fan 26 at its lower end.

Secured to the top of the main portion 5 of the motor casing 12 is an annular plate 28 the periphery of which supports the upper edge of a cylindrical filter. The filter comprises a fabric wall 29, in the form of a cylinder closed at one end, supported by a wire basket 30 arranged within it to prevent the fabric wall from collapsing.

The vertical and horizontal outer walls of the filter are adapted to be engaged 15 respectively by a vertical brush 31 and a horizontal brush 32. The vertical brush 31 is carried by a pair of parallel links 33 whilst the horizontal brush is carried by a single link 34, a coiled tension spring 20 35 being connected between one of the links 33 and the link 34 so as to hold both the brushes against the filter.

The cleaner is provided with a pivoted carrying handle 36.

25 In normal operation dirt-laden air is drawn through a cleaning tool and hose fitted to the socket 9 and is then drawn inwardly through the filter 29 so as to deposit the dirt on its outer surface. The 30 clean air is then exhausted through the tubular upper portion 13 of the motor casing and out through the openings 19.

Whenever the flexible cable is pulled out from the fair-lead 19 so as to be 35 unwound from the reel 14 the complete motor-fan assembly is caused to rotate about its vertical axis together with the filter. As the filter rotates while the brushes remain stationary the brushes 40 tend to travel over the filter surface to brush the dirt from it and allow it to fall down into the pan or container 7. Similarly when the reel is turned by the handle 21 to wind in the flexible cable the filter 45 is again brushed.

The arrangement shown in Figures 4 and 5 is generally similar to that of Figures 1 to 3, but in this case instead of having means for brushing the dirt from the filter it has means for shaking the filter to dislodge the dirt and allow it to fall into the pan 7.

As in the arrangement of Figures 1 to 3 the motor and reel for the flexible cable 55 rotate, but in this case the filter remains stationary. At the upper end of the motor casing is a sleeve 37 having around its lower edge turned up inclined portions forming cams 38.

60 The filter in this case comprises only a fabric wall in the form of a closed cylinder secured at its upper edge to a fixed flange or ring 39 carried by the top of the casing 6. Within the bottom of the 65 filter is a rigid perforated supporting disc

40 secured to a pair of vertical tubes 41 fitting over a pair of downwardly extending guide rods 42 which are encircled by helical compression springs 43. Each of the tubes 41 carries at its upper end an L-shaped bracket 44 the upper end of which carries a roller 45 acting as a cam follower to co-operate with the cams 38. Accordingly as the cam sleeve 37 is rotated the two rollers will ride up the inclined faces of the cams 38 until they reach the top when they will pass over the stepped ends and allow the spring 43 to thrust the tubes 41 and disc 40 suddenly downwards so as to jerk the filter 75 taut and thus shake the dirt and dust from it to allow it to fall into the pan 7.

In order to produce such rotation of the cam sleeve the sleeve carries a pawl 46 which, as shown in Figure 5, engages 85 ratchet teeth 47 formed on the upper tubular part 12 of the motor casing. Accordingly the cam sleeve will only be turned in one direction, which may be that corresponding to unwinding the 90 cable, but is preferably that corresponding to winding up the cable, since this operation is normally performed at the end of a cleaning operation.

It will be appreciated that in both the 95 constructions described the operation of cleaning the filter is performed automatically as a result of winding in or unwinding the cable and consequently cannot be overlooked. Moreover, the arrangement 100 provides a convenient arrangement for winding in the cable in which the cable is neatly stowed away when not in use and can be rapidly paid out as required. Moreover, by arranging the motor to 105 rotate and mounting the switch on the rotating part, it is possible to connect the cable directly to the motor without the interposition of any slip rings or the like.

110 What we claim is:—

1. A suction cleaner including a filter through which air is drawn by an electric-motor-driven fan, a reel for winding a flexible cable through which the motor is supplied, and means actuated by rotation of the reel for cleaning the filter as the cable is wound in and/or out.

2. A suction cleaner as claimed in Claim 1 in which the stator of the motor 120 is mounted to rotate about its axis with the cable reel.

3. A suction cleaner as claimed in Claim 1 or Claim 2 of the vertical axis canister type in which the cable reel is 125 mounted near the top of the cleaner to rotate about a vertical axis.

4. A suction cleaner as claimed in Claim 3 in which a part connected to the reel is provided with a handle accessible 130

at the top of the cleaner to turn the reel for winding in the cable.

5. A suction cleaner as claimed in any one of the preceding claims in which dust 5 is collected on the outside of a generally tubular filter, whence it can fall into a dirt-receiving container.

6. A suction cleaner as claimed in any 10 one of the preceding claims in which the filter is cleaned by means of a brush movable relatively to its surface.

7. A suction cleaner as claimed in Claim 6 in which the filter is mounted to rotate with the reel and is engaged by 15 one or more stationary brushes.

8. A suction cleaner as claimed in any one of Claims 1 to 5 in which the filter is cleaned by filter-shaking means.

9. A suction cleaner as claimed in 20 Claim 8 in which one end of the filter is

operatively connected to one or more cam followers co-operating with a cam arranged to rotate with the reel.

10. A suction cleaner as claimed in Claim 9 in which the cam is of stepped 25 form and is arranged to move the cam followers gradually in one direction against one or more springs to collapse the filter and then to allow them to return rapidly under the action of the springs to 30 taunt the filter, and is driven from the reel through a pawl and ratchet or other non-return connection.

11. A suction cleaner as specifically described herein with reference to Figures 35 1 to 3 or Figures 4 and 5 of the accompanying drawings.

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**682,137** **COMPLETE SPECIFICATION**  
**3 SHEETS** *This drawing is a reproduction of*

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SHEET 1

FIG. I

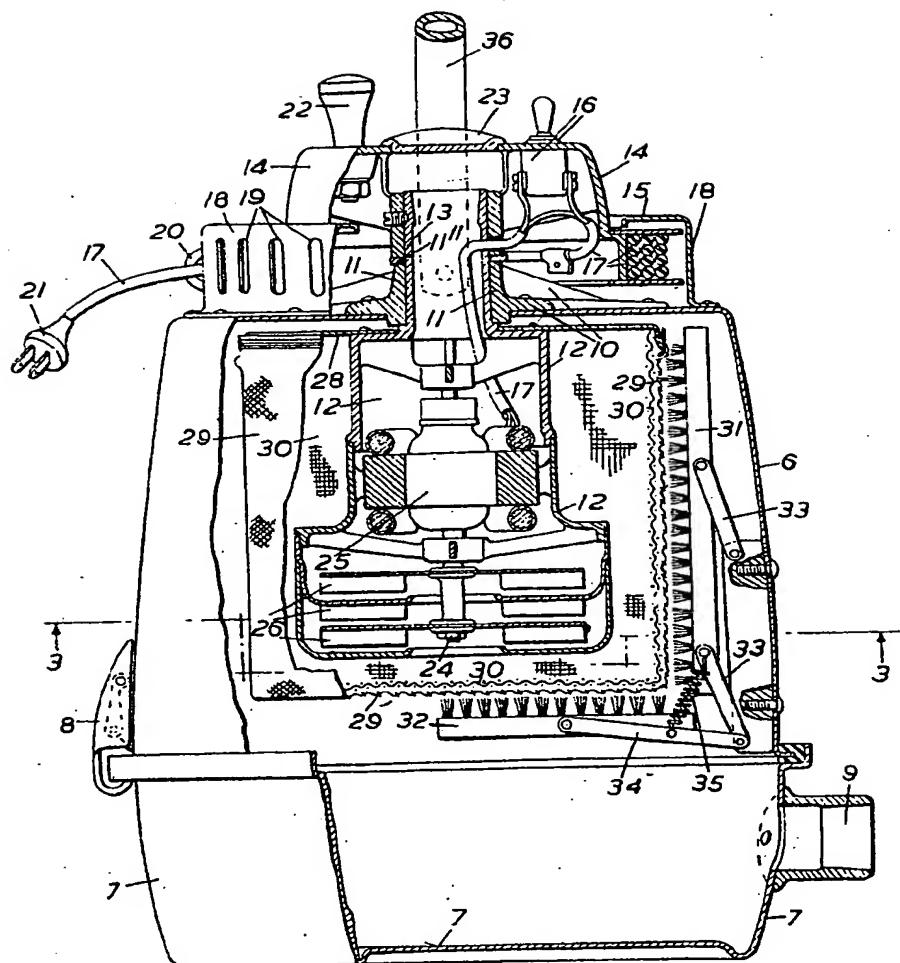


FIG. 2.

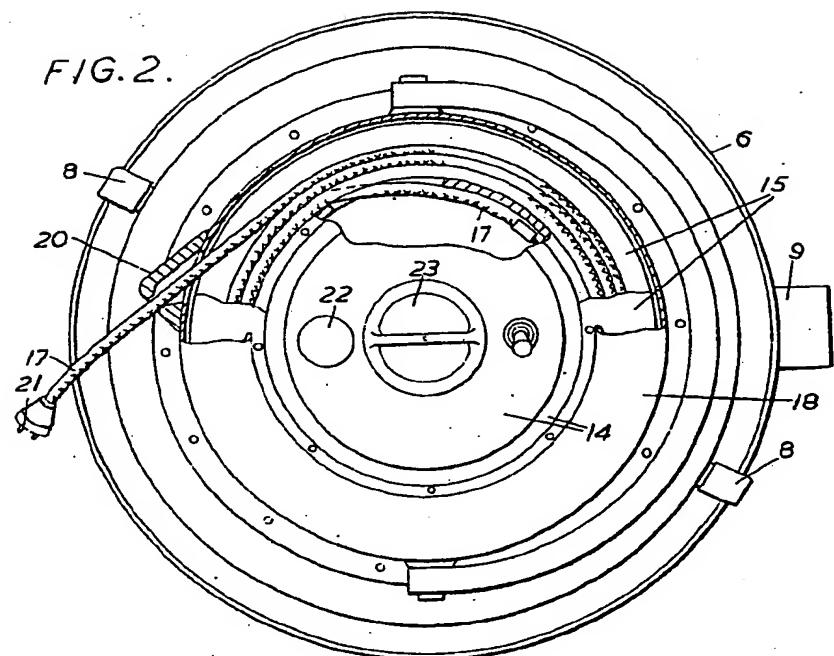
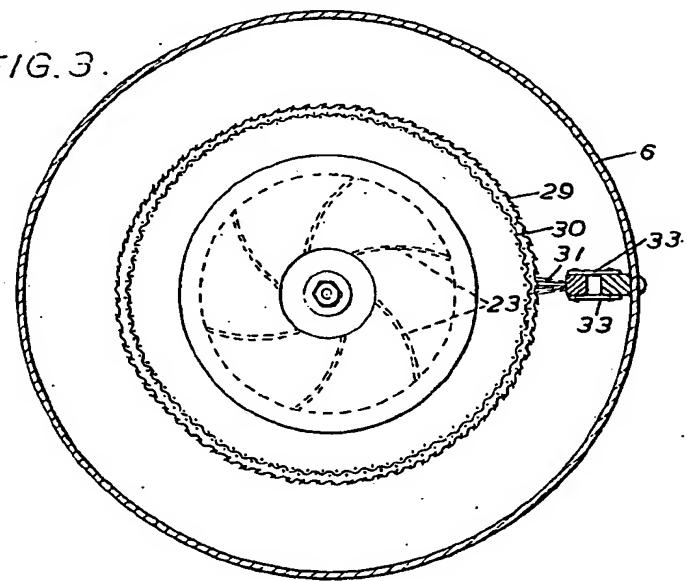


FIG. 3.

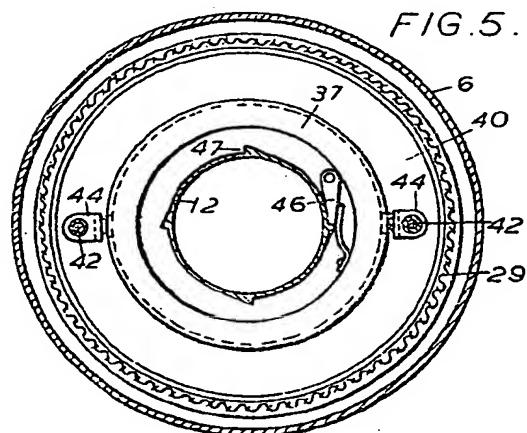
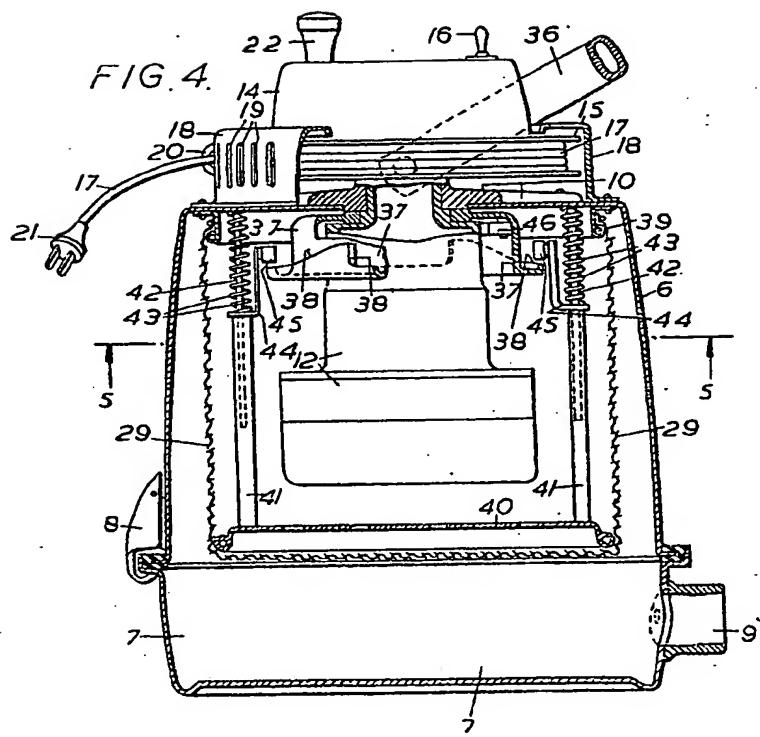


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3 SHEETS

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the Original on a reduced scale.

SHEETS 2 & 3



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